

Abstract of the Disclosure

Provided are a magnetic tunnel junction (MTJ) device and a method for fabricating the same. The MTJ device includes a substrate, and a fixed layer, a tunnel barrier, and a free layer sequentially stacked on the substrate. A magnetoresistance buffer layer formed of a metallic nitride is interposed between the fixed layer and the tunnel barrier. The entire MTJ device is thermally treated to reduce a magnetic junction resistance thereof. Nitrogen in the magnetoresistance buffer layer having a predetermined thickness is combined with elements of the tunnel barrier, thus improving uniformity of the tunnel barrier. Further, by performing nitrogen plasma processing and a thermal treatment, a high-performance MTJ device with a high MR ratio and a low RA value can be fabricated.